

Bridging the gap

Long life promised for new Powder Point Bridge

By Jeremy Crockford
The Patriot Ledger

DUXBURY — The design is familiar sturdy Yankee, but pine and oak are replaced in the new Powder Point Bridge by exotic iron-like timbers felled in far-distant rain forests.

After June, drivers will pass between the mainland and the Gurnet peninsula on a bridge of South American basralocus and ekki from the jungles of West Africa.

The 100-foot-high trees cut in Suriname, South America, and Cameroon, Africa, were milled with special equipment in the Netherlands because of their hardness.

They left Antwerp, Belgium, as planks, piles and stringers, bound by ship for America. During the next two or three weeks, those portions of the bridge not already trucked in will be barged up the channel of Duxbury Bay to the bridge.

There is a good reason for the long journey: The timbers are practically insect-, rot- and salt-proof, and are a tough adversary for all but the most determined

and well-armed vandal.

"You'll need a new pen-knife if you try to carve it," Highway Surveyor Gil Bliss said. "I haven't tried it, but supposedly paint will not hold to it, either."

The tropical woods are so naturally tough they do not need to be treated with the preservatives — suspected carcinogens — used in pressure-treated pine or oak.

Most importantly, ekki and basralocus aren't likely to be destroyed the way the old oak-and-pine bridge was in June 1985 — by fire.

"It's so dense there is little or no air in the wood to burn," Dick Drisco of For-Tek Inc. of North Billerica, supplier of the lumber said. "You might find charring on the outside, but if you take away the heat source, there isn't a fire. You can't have fire where you don't have air."

At mid-tide last year, fishermen, pedestrians and bicyclists — no motor vehicles were allowed on the 2,200-foot bridge after the fire — could feel the span swaying and hear the timbers groaning with the currents of the channel.

More than 70 feet of the bridge's road bed had burned

in the June fire.

The pilings had been eaten into hour-glass shapes by time and the tides, and undermined by marine animals.

Plank stringers and supports underwent constant piecemeal replacement and repair almost since the completion of the bridge in 1892.

In February 1986, Universal Engineering Corp. of Boston told the Powder Point Bridge Study Committee that even pedestrians should be kept off the span.

Engineer Thomas Parella told the town that a large ice flow could knock the creaking bridge down.

With the bridge closed to traffic, the Gurnet — a long sand spit dotted with dunes and summer homes — was further isolated from the mainland.

At the same time, beachgoers found themselves in five-mile long traffic jams when they were forced to bypass the bridge and drive to Duxbury Beach through neighboring Marshfield.

The bridge committee spent nearly two years trying to determine how best to replace the span.

Concrete or steel — fine for less affluent communi-

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ties or less scenic spots — were not considered for the span that ends near the mansions of King Caesar Road.

"When the town made the decision to go to the tropical hardwoods, it was based on a life-cycle cost," Burns said. "It is estimated that the piles and superstructure costing \$3 million will last 50 years or more."

"If we'd used southern yellow pine, it would have cost between \$5 and \$6 million in current dollars because, over the 50 years, you are replacing decking, stringers and piles on a relatively regular basis."

When shipworms devastated other trees of coastal Suriname, they barely made a dent in the basralocus.

"They were rarely able to dig in more than half an inch," said Sheila Connor, a librarian at the Arnold Arboretum in Boston.

Foresters attribute the toughness in part to silica in the fiber of the wood.

When a forester came upon piles of basralocus logs that had lain 14 years on the wet floor of the jungle, he found "the wood still sound," Connor said.

Ekki, equally tall and tough as basralocus, is not as well suited for pilings because the trees grow only five-feet in circumference, while the basralocus reach up to 20-feet in girth and easily produce the 11-inch by 14-inch piles.

Both trees render a reddish-orange timber that grays in sunlight to the color of weathered cedar.

"They've been used for bridge work for 20 years, but I'm not so sure you could call it popular until recently," Drisco of For-Tek said.

When Liberty Pier at the Statue of Liberty was renovated last year, the builders used ekki.

When the Duxbury bridge committee decided in 1985 the new span would be wood, they first looked to treated yellow southern pine. But the wood would build a bridge capable of



Workers on Powder Point Bridge remove old planks.

Greg Derr/The Patriot Ledger

supporting vehicles weighing only eight tons, and promised a need for repairs in 10 to 15 years.

"At that time, we started talking about tropical hardwoods, but up to then we thought they were cost-prohibitive," said Margaret Kearney of the bridge committee.

"It was about three times the cost for the wood, but over the life of the bridge, we were saving money," Kearney said. "It made sense to use tropical hardwoods."

"We heard things like there is no problem with graffiti and no problems with chewing gum because gum won't stick to it. We heard there was no problem with the deck soaking up rainwater because they won't absorb water into the grain," Kearney said.

Tom Enwright of Rhode Island's Harbor Marine, the bridge's builder, said working with the iron-hard wood is not a problem because every nail or bolt hole is pre-drilled with carbide-tipped tools.

"It's beautiful," Enwright said. "The wood is so different from most of the woods you use."

"They tell us the superstructure will last 70 years," he added. "Unfortunately, I won't be around to prove them a liar."

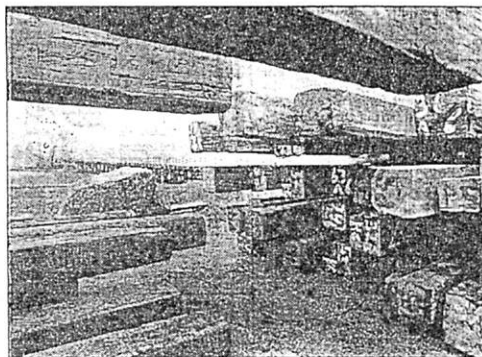
About 200 piles, each 35 to 55 feet long, have been driven 20 feet into the sand of the channel.

Workers from Harbor Marine are now moving a "template" along the old piles to set the new ones in groups of five. The piles rest on a stable layer of gravel beneath the sand and mud. Each pile-bundle must sustain a 10-ton test load.

"The template is basically a big steel frame with holes they stick piles through," Burns, the highway surveyor, said. "They drive 10 piles at a time, creating 40 feet of space at a time. It uses a vibratory hammer to shake them down into place."

"We get all the old stuff out of the way as we move along, except for the pilings," Enwright said. "We'll come back for those after the new bridge is in."

Because of the woods' strength, 600 piles will replace 1,000 from the old bridge, yet the new span will support 15 tons instead of the previous four. More than 300 piles are at the site now. The rest will be brought in by ship in the next few days.



Wood timbers are stockpiled for new bridge.

Greg Derr/The Patriot Ledger

Sometime early next week, the decking will begin to arrive — pre-assembled in 20-foot lengths the full 21-foot width of the span.

They will be lifted by cranes to take their places atop the pilings and

supports.

"I expect the first car to drive over on the 20th of June," Burns said.

"It's a very nice bridge and the people in Duxbury have done a hell of a job," Drisco said.